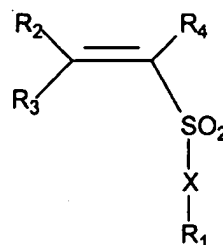
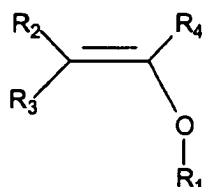
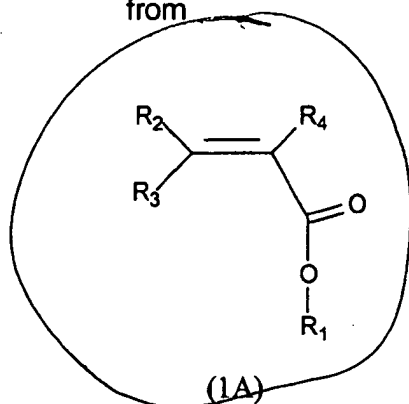


## Claims

1. A photoresist composition comprising:
  - a) a polymer that is insoluble in an aqueous alkaline solution and comprises at least one acid labile group, and comprises at least one monomer unit having a pendant group selected from unsubstituted or substituted higher adamantanes and mixtures thereof; and
  - b) a compound capable of producing an acid upon irradiation.

2. The photoresist composition of claim 1 wherein the monomer unit is selected from



wherein

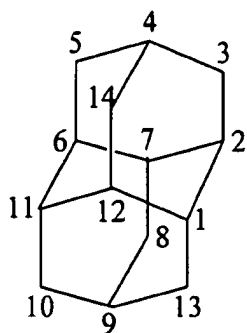
- 15  $R_1$  is  $-Z$  or  $-Y-Z$  where  $Y$  is a linear or branched alkylene or a monocyclic or polycyclic alkylene,  $Z$  is unsubstituted or substituted higher adamantane;  $R_2$ ,  $R_3$ , and  $R_4$  are each independently selected from hydrogen, alkyl, alkoxyalkyl, cycloalkyl, cycloalkenyl, aryl, aralkyl, and CN or any two of  $R_2$ ,  $R_3$ , and  $R_4$  together with the carbon atoms to which they are attached form an unsubstituted or substituted mono-  
20 or polycycloalkenyl;  $X$  is O or  $NR_2$ .

3. The photoresist composition of claim 2 wherein the monomer unit is

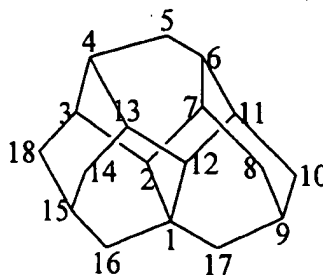
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Examples of higher adamantanes include diamantane, triamantane, and tetramantane. In general, adamantanes have the general formula of  $C_{(4k+6)}H_{(4k+12)}$  where  $k = 0, 1, 2, 3$ , and so on. When  $k$  is 0, the formula is that of adamantane; when  $k$  is 1, the formula is that of diamantane; when  $k$  is 2, the formula is that of triamantane, and so forth.

The IUPAC numbering scheme for diamantane and triamantane is shown below (from United States Patent No. 5019660 and United States Patent No. 5576355)



Diamantane



Triamantane

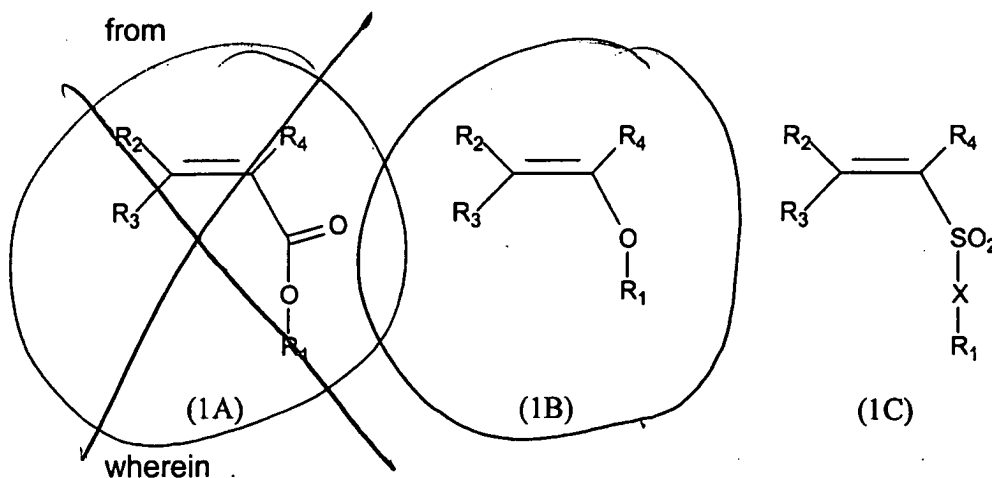
Examples of structures for  $Z$  include, for example, 3- (or 5-)alkyl-diamantanes and 5- or 18-alkyl-triamantanes, e.g.,

## Claims

1. A photoresist composition comprising:

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wherein

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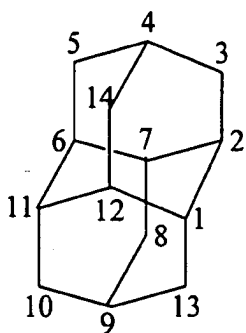
3. The photoresist composition of claim 2 wherein the monomer unit is

$R_1$  is  $-Z$  or  $-Y-Z$  where  $Y$  is a linear or branched alkylene or a monocyclic or polycyclic alkylene,  $Z$  is unsubstituted or substituted higher adamantane;  $R_2$ ,  $R_3$ , and  $R_4$  are each independently selected from hydrogen, alkyl, alkoxyalkyl, cycloalkyl, cycloalkenyl, aryl, aralkyl, and CN or any two of  $R_2$ ,  $R_3$ , and  $R_4$  together with the carbon atoms to which they are attached form an unsubstituted or substituted mono- or polycycloalkenyl;  $X$  is O or  $NR_2$ .

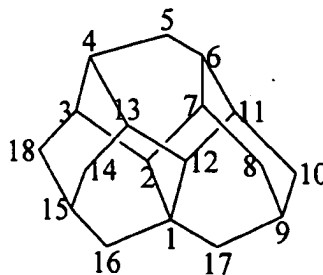
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15



Diamantane



Triamantane

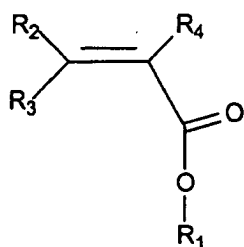
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## Claims

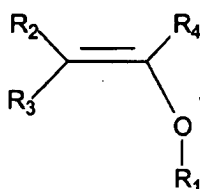
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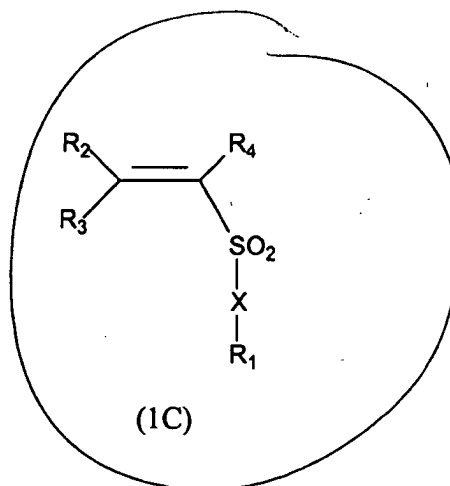
2. The photoresist composition of claim 1 wherein the monomer unit is selected from



(1A)



(1B)



(1C)

wherein

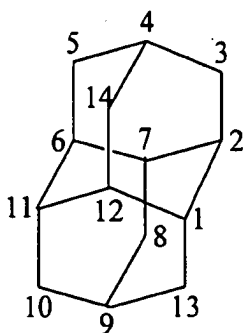
- R<sub>1</sub> is -Z or -Y-Z where Y is a linear or branched alkylene or a monocyclic or polycyclic alkylene, Z is unsubstituted or substituted higher adamantane; R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are each independently selected from hydrogen, alkyl, alkoxyalkyl, cycloalkyl, cycloalkenyl, aryl, aralkyl, and CN or any two of R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> together with the carbon atoms to which they are attached form an unsubstituted or substituted mono- or polycycloalkenyl; X is O or NR<sub>2</sub>.

3. The photoresist composition of claim 2 wherein the monomer unit is

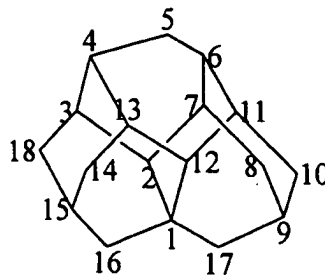
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